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The Outcomes of Left Thoracotomy and Esophagogastrostomy Method in Patients with Esophageal Cancer in Babol City, Northern Iran (2004-2011)

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Abstract

Background: Since esophageal cancer is highly prevalent, and has a high cost for patients and society, this study aimed to investigate the result of surgery in esophageal cancer with esophagogastrostomy method to lower the problems of these patients.

Methods: In this cross-sectional study, all patients who were diagnosed with esophageal and upper gastric cancer with surgical indications during 2004 to 2011 in Shahid Beheshti hospital, Babol City, Iran, participated. Patients then underwent esophagogastrostomy surgery. Patients' data were gathered using a survey and analyzed using t and chi-square tests via SPSS software. A P-value of less than 0.05 was deemed statistically significant.

Results: A total of 47 patients who were confirmed as having esophageal cancer by pathologic evaluation, were investigated. A significant relationship was observed between body mass index and complications after surgery (P = 0.04). 57.1% of underweight patients and 100% of obese patients experienced complications. No significant relationship was seen in other factors. The average age of patients who experienced complications was higher than those who reported no complications, and the difference was statistically significant (P = 0.03). Moreover, the duration of surgery was significantly higher in patients with complications (P = 0.01).

Conclusions: It would seem that complications after surgery were higher in underweight patients and the duration of surgery was higher in these patients. No significant relationship was seen in other factors.

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Introduction

Esophageal cancer is the seventh cause of death by cancer in the world. It affects over 450 thousand people per annum, and its prevalence is rapidly rising (1,2). Esophageal cancer is also highly prevalent in Iran, in a way that in a ten-year study estimating the occurrence of cancer from 1969 to 1978, it was considered the most prevalent type of cancer (3). In Turkmen Sahra regions, the occurrence rate is 108.8 per hundred thousand and 174.1 per hundred thousand per year in men and women, respectively. Surgery is considered the main treatment in patients who have no limitations/complications for surgery (4).

The general survival rate for esophageal cancer patients varies between 15% to 25% in 5 years, and diagnosis in primary stages is beneficial to the treatment (5). Many varied methods of surgery are available for patients with esophageal cancer and upper stomach cancer. Choosing surgery as treatment for esophageal carcinoma depends on the anatomical stage of illness, the patients' ability to ingest, and the primary position of the tumor (6,7).

This study evaluated left thoracotomy accompanied by esophagogastrostomy technique using a tongue-shaped seromuscular flap as a method of surgery. The use of a tongue-shaped seromuscular flap is a method used in the presence of anastomosis in the thorax, in order to protect the anastomosis, lower the possibility of anastomotic leaks, and lessen the severe subsequent complications (8,9). The death rate of esophageal resection has significantly decreased within the last two

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decades and reached under 10% (1,10). This disease is highly prevalent and treatment is expensive for patients and society; this study aimed to investigate the result of surgery in esophageal cancer with esophagogastrostomy method to lower the problems of these patients.

Materials and Methods

In this cross-sectional study, all patients who were diagnosed with esophageal and upper gastric cancer with surgical indications during 2004 to 2011 in Shahid Beheshti hospital, Babol City, Iran, participated. All patients were first examined by a thorax surgeon, their stage of cancer diagnosed, and evaluated for the existence of metastasis and cardiopulmonary problems which prevented surgery. Then, patients underwent left thoracotomy and esophagogastrostomy surgery using a tongue-shaped seromuscular flap.

Patients' data were gathered using a survey. The survey included age, gender, weight, period of weight loss, body mass index (BMI), surgical complications (up to a month), duration of surgery, hemoglobin levels, albumin levels, start of oral nutrition, and location and type of tumor.

Data were analyzed using t and chi-square tests via SPSS software (version 22, IBM Corporation, Armonk, NY, United States). A P-value of less than 0.05 was deemed statistically significant.

Results

A total of 47 patients who were confirmed as having esophageal cancer by pathologic evaluation, were evaluated. Demographic data of these patients is presented in table 1.

Table 1. The demographic data of studied patients

Variable	Number (%)
Gender	
Male	31 (65.9)
Female	16 (34.1)
Age group	
50-70 years	32 (68.1)
71-90 years	15 (31.9)
Body mass index (BMI)	
Underweight	7 (14.9)
Normal	32 (68.1)
Overweight	7 (14.9)
Obese	1 (2.1)
Background illness	3 (6.4)
Tumor location	
Distal	23 (48.9)
Middle	10 (21.3)
Cardia	14 (29.8)
Diagnosis	
Squamous cell carcinoma	33 (70.2)
Adenocarcinoma	14 (29.8)
Postoperative complications	
Cardiac	7 (14.9)
Pulmonary	4 (8.5)
Neurological	2 (4.3)
Cardiopulmonary	3 (6.4)

In table 2, the mean and standard deviation (SD) for the studied quantitative variables is presented in detail.

Table 2. The mean and standard deviation of quantitative variables

Variable	Value*	Range
Age (year)	66.26 ± 7.27	50-84
Weight (kg)	59.62 ± 9.59	43-80
Weight loss (kg)	6.89 ± 3.68	0-20
Length of weight loss (day)	3.72 ± 2.24	0-16
Hemoglobin (g/dl)	12.50 ± 1.71	7.3-15.4
Albumin (g/dl)	4.15 ± 0.46	3.23-5.87
Duration of surgery (minute)	168.30 ± 23.22	90-225
Start of oral nutrition (day)	5.38 ± 0.64	4-8
Hospitalization (day)	8.02 ± 1.67	6-15

* The amounts are presented as mean ± standard deviation.

A significant relationship was observed between BMI and complications after surgery (P = 0.04). 57.1% of underweight patients and 100% of obese patients experienced complications. No significant relationship was seen in other factors (Table 3).

Table 3. The relationship between studied variables and postoperative complications

Variable	Postoperative complications		P-value
	Yes	No	
Gender			0.77
Male	11 (35.5)	20 (64.5)	
Female	5 (31.3)	11 (68.8)	
Age group			0.32
50-70 years	9 (28.1)	23 (71.9)	
71-90 years	7 (46.7)	8 (53.3)	
Body mass index (BMI)			0.04
Underweight	4 (57.1)	3 (42.9)	
Normal	11 (34.4)	21(65.6)	
Overweight	-	7 (100)	
Obese	1 (100)	-	
Diagnosis			0.32
Squamous cell carcinoma	13 (39.4)	20 (60.6)	
Adenocarcinoma	3 (21.4)	11 (78.6)	
Tumor location			0.37
Distal	10 (43.5)	13 (56.5)	
Middle	3 (30)	7 (70)	
Cardia	3 (21.4)	11 (78.6)	

The amounts are presented as number (percent).

The average age of patients who experienced complications was higher than those who reported no complications, and the difference was statistically significant (P = 0.03). Moreover, the duration of surgery was significantly higher in patients with complications (P = 0.01) (Table 4).

Discussion

The highest reported occurrence rate for esophageal cancer in the world is attributed to a report from the Caspian Sea cancer center in 1973.

Table 4. The differences between postoperative complications and different variables.

Variable	Postoperative complications		P-value
	Yes	No	
Age (year)	69.44 ± 6.61	64.61 ± 7.14	0.03
Weight (kg)	55.94 ± 9.68	61.52 ± 9.12	0.06
Weight loss (kg)	7.13 ± 3.26	6.77 ± 3.93	0.76
Length of weight loss (day)	4.13 ± 3.42	3.52 ± 1.13	0.38
Hemoglobin (g/dl)	12.75 ± 1.09	12.40 ± 1.96	0.54
Albumin (g/dl)	4.20 ± 0.44	4.13 ± 0.47	0.62
Duration of surgery (minute)	180.00 ± 21.21	162.26 ± 22.16	0.01
Start of oral nutrition (day)	5.56 ± 0.81	5.29 ± 0.52	0.19
Hospitalization (day)	8.53 ± 2.12	7.73 ± 1.31	0.17

The amounts are presented as mean ± standard deviation.

The report states that the occurrence rate for esophageal cancer in the over-35-year age group was 165.5 and 195.3 per hundred thousand in Gonbad, Iran for men and women, respectively (11). However, only a small part of cancer-related research has been dedicated to this field.

In this study, patients with different extreme BMIs, underweight and obese, suffered more postoperative complications. Moreover, patients who went through postoperative complications had a higher age average in comparison to other patients. The duration of surgery significantly affected patients with postoperative complications. 63.8% of patients were without complications and 36.2% experienced postoperative complications. In another study performed by Nikbakhsh et al. comparing transhiatal and right transthoracic surgeries, the rates of complications were 42.9% and 47.1%, respectively (12). Similar studies performed by Connors et al. on 17395 patients (13), Goan et al. on 216 patients (14), Chou et al. on 73 patients (15) have not found any significant differences. In a study performed by Gockel et al. on 424 patients (16) and a meta-analysis by Hulscher et al. (17), the complications following transthoracic surgery were reported to be significantly more common than complications following transhiatal surgery.

Among postoperative complications, cardiovascular complications rank first and make up 21.3% of the total. However, in the study performed by Nikbakhsh et al. pulmonary complications and anastomosis leakage reported to be the most common complications (12). Based on the results obtained from a study carried out by Jensen et al. on 166 patients with esophageal cancer who had undergone transthoracic surgery, pulmonary complications were the most prevalent complications (18). However, this is in contrast with the results obtained in our study.

In the current study, it was observed that esophageal cancer was more prevalent in men. Postoperative complications were also higher in men. However, this factor was not statistically significant, and esophageal cancer is prevalent in both genders (19). In this study, the incidence ratio of men to women was 1.9 to 1. In a study performed by Rajaeifard et al. the gender ratio for esophageal cancer was reported to be 1.6 to 1 (men to women) (20). Gender ratio for esophageal cancer factor was reported to be 0.85% in Gonbad, Iran (11), 1% in the south east of the Caspian Sea (21), 1.04% in Babol, Iran (3), 1.5% in Imam Khomeini hospital, Tehran, Iran (4), 1.36% in Golestan Province, Iran (22), 1.4% in Pakistan (23), 1% in Uzbekistan (24), 1.5% in Kenya (25), 1.4% in China (26), 3% in Lithuania (27), 4.6% in Europe (28), and 2.4% in white Americans. A possible explanation for this difference may be geographical differences.

In this study, patients were mainly over the age of 50 and under 70 years. The 50-70-year age group was most at risk for postoperative complications, even though no significant relationship was found. The age average in this study was higher in the postoperative complication group, which was not statistically significant. The frequency of disease and illness in old age, along with lowered capabilities, signs, and symptoms are missed which may be a possible explanation for the late diagnosis of esophageal cancer. However, it seems that the age for esophageal cancer has decreased in Iran.

48.9% of tumors were located in the distal region of the esophagus in our study, and in a study performed by Rajabi et al., 71.7% of tumors were located in the aforementioned region (29). The locations of tumors in this study are in accordance with the study performed by Nikbakhsh et al. (12).

In regards with histology, squamous cell carcinoma was observed in 70.2% of cases. So, tumor histology in this study is similar to the study performed by Rajaeifard et al. (20). Furthermore, in patients who experienced postoperative complications, histological reports showed that 81.3% of cases showed squamous cell carcinoma. In the study performed by Rajabi et al., tumor histology showed squamous cell carcinoma and adenocarcinoma in 76.7% and 23.3% of cases, respectively (29).

The average duration of surgery was 168.30 ± 23.22 minutes in this study. Duration of surgery in the study by Nikbakhsh et al. was 180 and 226 minutes for transhiatal and transthoracic surgeries, respectively (12).

The limitations of this study are the lack of a control group, and that the survival rate was not considered.

Conclusion

It would seem that postoperative complications were higher in underweight patients, and the duration of surgery was also higher in these cases. No significant relationship was seen in other factors.

Conflict of Interests

Authors have no conflict of interests.

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